

CURRICULUM VITAE

**Steven Michael Opal
Associate Professor of Medicine
Director of the Infectious Disease Fellowship Program
Brown University School of Medicine
Providence, Rhode Island**

PERSONAL INFORMATION

Date of Birth: 07/21/50
Place of Birth: Bainbridge, New York, USA
Citizenship: USA
Marital Status: Married, two children
Military Experience: 9 years, active duty US Army, honorable discharge 1985,
Army commendation medal
Social Security Number: 128-40-9307
Home Address: 11 Briarwood Drive
Barrington, Rhode Island 02806
Professional Address: Division of Infectious Diseases
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EDUCATION

1972 B.S. Cornell University, B.S.in Microbiology with Distinction,
Dean's List

1976 M.D. Albany Medical College of Union
University, Albany, New York.
Alpha Omega Alpha, Honor Medical
Society - Cum Laude, M.D.

POST GRADUATE TRAINING

Internship: Fitzsimons Army Medical Center,
1976-77 Denver, Colorado

Residency:

1977-79 Internal Medicine Residency,
Fitzsimons Army Medical Center

1978-79 Chief Resident in Medicine
Fitzsimons Army Medical Center
Denver, Colorado

Fellowship:

1980-82 Infectious Disease Fellowship
Walter Reed Army Medical Center
Washington, D.C.

Tropical Medicine Training:

1981 Armed Forces Institute of Pathology Walter Reed Army
Institute of Research. Washington, D.C.

PROFESSIONAL LICENSES AND BOARD CERTIFICATION

1985 Rhode Island License Registration No. 6676; DEA No.
B00997518

1979 American Board of Internal Medicine

1984 American Board of Internal Medicine Infectious Disease
Specialty

1987 License for use of radioactive isotopes in Biomedical research;
RI # 7B-043-01

PROFESSIONAL FACULTY APPOINTMENTS

- 1980-82 Teaching Fellow, Uniformed Services University of the Health Sciences
- 1981-82 Instructor, Uniformed Services, University of the Health Sciences
- 1984-85 Clinical Assistant Professor of Medicine, University of Colorado Health Sciences Center, Denver, Colorado
- 1985-1991 Assistant Professor of Medicine, Brown University School of Medicine
- 1988-present Adjunct Assistant Professor of Medicine, University of Rhode Island
- 1988-present Associate, Brown University Program in Geographic Medicine
- 1991-present Associate Professor of Medicine, Brown University School of Medicine
- 1995-present Director of the Infectious Disease Fellowship Program, Brown University School of Medicine

HOSPITAL APPOINTMENTS

- 1982-83 Assistant Chief, Infectious Disease Service, Fitzsimons Army Medical Center, Aurora, Colorado
Member, Pharmacy Committee and Infection Control Service
- 1984-85 Chief, Infectious Disease Service, Fitzsimons Army Medical Center, Aurora, Colorado
Chairman, Infection Control Committee
- 1985-present Director: Travel Clinic, and Infection Control Service, Memorial Hospital of Rhode Island, Pawtucket, Rhode Island.
- 1985-present Active Medical Staff Attending Physician, Department of Medicine, Division of Infectious Disease, Memorial Hospital Pawtucket, Rhode Island
- 1986-present Consulting Staff Attending Physician, Department of Medicine Miriam Hospital, Providence, RI.

1989-present Consulting Staff, Attending Physician. Rhode Island Hospital Providence, Rhode Island

1995-present Active Staff physician, Infectious Disease Division, Roger Williams Medical Center, Providence, RI.

HOSPITAL COMMITTEES

Chairperson; Infection Control Committee, Member; Pharmacy Committee, Chairperson, Clinical Competence Committee, Intern Selection Committee, Radiation Safety Committee

UNIVERSITY COMMITTEES

Member, Biohazard Safety Committee, Brown University Curriculum Committee, Infectious Disease Fellowship Program, Brown University
Knowledge Base Working Group on Health Promotion and Disease Prevention
PHD Promotions Board - Microbiology and Immunology

HONORS

Clinical Teacher of The Year Award Fitzsimons Army Medical Center 1983, 1984, 1985.

Teacher Of The Year Award Memorial Hospital Brown University Affiliated Hospital - 1986, 1987, 1988, 1994.

Special Award in Excellence in Teaching: Brown University Infectious Disease Fellows - 1990.

Master of Arts Degree (ad eundem) - Brown University, 1992

NATIONAL CONVENOR, RESEARCH AWARDS, AND HONORS

William Christian Annual Award for Excellence in Scientific Research, American Federation of Clinical Research, Seattle, Washington - 1991

Bright Young Investigator Award, International Immunocompromised Host Society, Boulder Colorado, 1992.

Co-moderator, Mini-symposium on Immunomodulators - International Immunocompromised Host Society. Boulder, Colorado. June, 25, 1992.

Co-moderator, The Second Consensus Development Conference on the Treatment of Radiation Injury. (Sepsis Conference) . National Radiobiology Research Institute, Bethesda, Maryland, April 14-17, 1993.

Chairman, The Fourth Annual Vienna Shock Society Meeting. Experimental Hopes in the Treatment of Sepsis session . Vienna, Austria. May 8, 1993.

Co-moderator, Session on Endotoxin, sepsis and shock models, ICAAC Annual Meeting, New Orleans, LA. October 19, 1993

Co-moderator, Oral presentation of abstracts to the 5th International Steglitz Symposium on Sepsis, Berlin, Germany, February 10, 1994

Co-moderator and panel member. International Consensus Conference on Immunotherapy of Sepsis. 3rd International Congress on the Immune Consequences of Trauma, Shock and Sepsis. Munich, Germany. March 1994.

Co-moderator and panel member, Session on Inflammatory Mediators and Design of Clinical Sepsis Trials. Autumnal Thematic Meeting on Sepsis, Deauville, France, November 8, 1994

Co-moderator. Session on Experimental Studies in Endotoxin Research. ICAAC Annual Meeting, Orlando, Florida, October 5, 1994

Co-moderator, Session on Immunomodulators. 15th Annual International Symposium on Intensive Care and Emergency Medicine, Brussels, Belgium, March 22, 1995.

Chairman - Session on Endotoxemia and Vaccine Development. National Consultants Meeting for Infectious Diseases. Palm Beach, Florida, May 20, 1995

Meet the Professor Session of the American College of Physicians Meeting - Rhode Island Chapter. April 25, 1995

Co-moderator, Session on Clinical Trials for Sepsis, ICAAC Annual meeting, San Francisco, CA, September 21, 1995

Moderator, Session on Experimental Studies on Endotoxin and Sepsis, ICAAC Annual meeting, San Francisco, CA, September 20, 1995.

Moderator, Session on multiresistant pathogens in the ICU - the 16th International Symposium on Intensive Care and Emergency Medicine, Brussels, Belgium, March 21, 1996.

Co-chairman - International Workshop on Antibiotic-Induced Endotoxin Release. Morristown, NJ, January 16, 1996.

Chairman - Clinical Trials for Septic Shock Workshop, IBC International Conference on Endotoxemia and Septic Shock, Boston, MA, June 24-26, 1996

Co-moderator - Session on sepsis. The 36th ICAAC Annual Meeting, New Orleans, LA, September 17, 1996

Chairman - Session on Antibiotic Use in the ICU. The 10th Annual Meeting of the Society of Anesthesia, Pulmonary, Intensive Care and Emergency Medicine. Trieste, Italy. November 6, 1996.

NATIONAL OR INTERNATIONAL REVIEW COMMITTEES:

- 1993 Board Member: VA Cooperative Studies Program Coordinating Center - Data Monitoring Board on Infectious Diseases - Hyperimmune globulin Studies in Prevention of Nosocomial Infection.
- 1993 Independent Review Panel: VA Research Program of Investigator-initiated Grant Proposals - Infectious Diseases and Shock Research.
- 1995 International Immunocompromised Host Society - Committee on Inflammatory Cells and Mediators.

TEST PREPARATION COMMITTEES:

Infectious Disease Subspecialty Section; Medical Knowledge Self Assessment Program, American College of Physicians-1994

BOOK EDITOR:

- 1995 Textbook of Infectious Diseases and Microbiology: Section Editor: Commonly Encountered Problems. (S. Opal & J. Cohen,) Mosby-Wolfe Publishers, London, U.K. (Publication date - 1998)
- 1996 Endotoxin; Its Role in Health and Disease; Section editor on experimental models and clinical medicine (D. Morrison, S. Opal, H. Braude, S. Vogel editors). Marcel Dekker Publishers (Publication date - 1998).

MAJOR TEACHING ROLES

Preceptor: Second, third, and fourth year medical students; Physical Diagnosis, Internal Medicine Clerkship, Infectious Diseases.

Lecturer: Brown University Integrated Medical Sciences Course in Infectious Diseases (Assistant course leader - 1989, 1990, 1991)
Brown University American Contemporary Health Series
Brown University Graduate Immunology Series
Brown University Course UC 107, Health Problems of The Developing World.
Brown University Course - Bio128 - Basic Pharmacology
Brown University Course BIO158 - Microbiology and Basic Immunology
Brown University Course BIO160 - Advanced Immunology
Brown University Course BIO184 - Basic and Clinical Pathology
Brown University Course BIO254 - Immunology of Infectious Diseases
University of Rhode Island, Graduate Program in Clinical Laboratory Science.
Brown University AIDS Program For Primary Care Physicians

MEMBERSHIP AND FELLOWSHIP IN SOCIETIES

- 1983 Member, American Society for Microbiology
1985 Member, Infectious Disease Society of America
1987 Member, American Medical Association
1987 Member, Rhode Island Medical Society
1990 Member, American Federation of Clinical Research
1991 Member, Society for Critical Care Medicine
1992 Member, International Immunocompromised Host Society.
1993 Member, International Endotoxin Society
1995 Fellow, Infectious Disease Society of America

OTHER APPOINTMENTS

Advisor:

Hospital Association of Rhode Island Protocols in Infectious Diseases;
AIDS Advisory Committee of the Rhode Island Medical Society;
Infectious Diseases Consultant - Rhode Island Department of Health.
Consultant at Sexually Transmitted Diseases Clinic - Rhode Island
Department of Health
Rabies Control Committee, Lyme Disease Control Committee and
Mosquito Control Committee, Rhode Island Department of Health

Associate:

Clinical Septic Shock Study Group - Cleveland Clinic Foundation - Clinical
Evaluation Committee (Co-Chairperson)

Reviewer:

American Journal of Pathology

American Journal of Physiology

Antimicrobial Agents and Chemotherapy

Archives of Internal Medicine

British Medical Journal - Gut

Cancer Research

Chest

Clinical Infectious Diseases

Critical Care Medicine

Infection and Immunity

Journal of the American Medical Association

Journal of Clinical Microbiology

Journal of Clinical Investigation

Journal of Endotoxin Research

Journal of Infectious Diseases

Lancet

Journal of Immunology

Reviews of Infectious Diseases

Southern Medical Journal

Book Reviews:

Journal of The American Board of Family Practice

New England Journal of Medicine

Director:

Division of Validated Animal Models: Brown University/University of
Rhode Island Cooperative Center of Antimicrobial Research

Graduate and Post-Graduate Research Faculty Advisor:

1. J. Bellingham - Medical Research Council of the United Kingdom - Advanced Fellowship Training in Critical Care Medicine and Infectious Diseases project - animal models in septic shock research (Co-preceptor with Dr. C.J. Fisher, Cleveland, Ohio) - 1991.

2. G. Victor - Laboratory research supervisor for 1 year. Fellowship grant in sepsis research. Project - Combination immunotherapy sepsis Celltech Ltd., Slough, U.K. - 1992.
3. R.L.C. Romulo - Laboratory research supervisor for 2 year fellowship grant in monoclonal antibody research. Project - Anti-endotoxin monoclonal antibodies in gram-negative sepsis. Xoma, Berkeley, CA 1993-1994.
4. J. Orange, M.D., Ph.D. Program at Brown University School of Medicine. Ph.D. thesis project on interleukin-12 modulated effects chronic viral infection - 1996.

Medical Advisory Board of Directors:

Center for Hope Care Center, Monrovia, Liberia. R. Meyers, Director

Visiting Professor:

1. Lecture: "Virulence Factors in E. coli Urinary Tract Infection." Winthrop University; Nassau County Hospital, Mineola, New York, September 18, 1986.
2. Lecture: "Immunotherapy in Gram Negative Sepsis." Rose Memorial Hospital, University of Colorado Health Sciences Center, Denver, Colorado, May 3, 1988.
3. Lecture: "Genetics of Methicillin Resistant S. aureus." University of Arkansas School of Medicine, Little Rock, Arkansas, May 5, 1988.
4. Lecture: "Monoclonal Antibody Therapy in Experimental Pseudomonas Sepsis." Celltech Limited Conference in Septic Shock, Slough, United Kingdom, May 24, 1988.
5. Lecture: "Current Treatment of Septic Shock." Medical College of Georgia, Eisenhower Army Medical Center, Augusta, Georgia, March 23, 1990.
6. Lecture: "Opportunistic Fungal Infection." New York Medical College, Lincoln Hospital, New York, New York, April 18, 1990.
7. Lecture: "Infectious Disease Rounds." Cleveland Veteran's Administration Medical Center, Case Western Reserve University, Cleveland, Ohio. September 8, 1990.
8. Lecture: "BPI, the next wonder drug for sepsis?" Walter Reed Army Institute of Research. Walter Reed Army Medical Center, Washington, DC. January 14, 1992
9. Lecture: "Multi-organ dysfunction syndrome of sepsis" John Tyler Memorial Lecture for the Massachusetts Thoracic Society. Boston, Massachusetts, April 9, 1992.

10. Lecture: "The next generation of immunotherapeutic agents in the management of septic shock. Robert Wood Johnson Medical School, Camden, New Jersey. March 11, 1993
11. Lecture: "BPI as an endogenous anti-endotoxin protein." Paris V University. Paris, France. March 26, 1993.
12. Lecture: "Penicillin-resistant strains of invasive Streptococcus pneumoniae." Makati Medical Center, University of the Philippines. Manila, Philippines, May 12, 1994.
13. Lecture: "Clinical Trials For Sepsis: What's Gone Wrong?" University of Massachusetts Medical Center, Worcester, MA., February 16, 1995.
14. Lecture: "Multidrug resistant bacterial infections in the ICU". Rush-Presbyterian Medical Center, Chicago, Illinois, October 29, 1995.
15. Lecture: "Recent advances in the understanding of the pathophysiology of sepsis." The University Hospital of Malaysia, Kuala Lumpur, Malaysia, July 15-16, 1996.

MEDICAL GRAND ROUNDS:

Memorial Hospital, Miriam Hospital, Hasbro Children's Hospital, Women and Infants Hospital, Landmark Hospital, Rhode Island Hospital, Roger Williams Hospital, Veteran's Administration Medical Center, Brown University, Providence, Rhode Island

GRANTS

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| 1983 | Survey of Extrachromosomal Elements of Legionella Pneumophilia Serotype I. Principal Investigator - U.S. Army Grant (\$5,000.00) |
| | The genetics of Exfoliatin B production by <u>Staphylococcus aureus</u> Phage Group I. Principal investigator - U. S. Army Grant. (\$5,000.00) |
| 1984 | Survey of Atmospheric Contamination of Hospital Air by <u>Aspergillus</u> spp. Spores During Hospital Construction. Principal Investigator - U.S. Army Grant. (\$5,000.00) |
| 1985 | The Molecular Epidemiology of Multi-Resistant and Methicillin-Resistant <u>Staphylococcus aureus</u> Infections in Selected Rhode Island Hospitals. Principal Investigator - Rhode Island Foundation. (\$3,500.00) |
| 1986 | The use of a DNA probe for iron assimilation to detect its presence in Bacteremic, Urinary, and Stool Isolates of <u>E. coli</u> . Biomedical Research Support Grant - Principal Investigator. (\$8,000.00) |

- 1987 The utility of human monoclonal antibody against coreglycolipid and cachectin in the neutropenic rat model of experimental *Pseudomonas* sepsis. Principal Investigator. Competitive Award. Celltech Limited, Great Britain. (\$76,000.00)
- Heterosexual HIV Transmission in Greater Providence - Principal Investigator - Kenneth H. Mayer - Co-investigator - R01-AI-25828-01, NIAID Grant. (\$2.1 million)
- 1988 The Cloning and Molecular Characterization of a Unique Beta-Lactamase Which Hydrolyzes Imipenem. Principal Investigator - Biomedical Research Support Grant. BMRSG 88-05. (\$6,700.00)
- 1989 Efficacy of antibiotic coated catheters in preventing catheter infections (in vitro and in vivo study) - Principal Investigator. Davol Inc. (\$34,000)
- 1990 Multicenter Prospective study to investigate the safety and pharmacokinetics of four dosage regimens of CB0006 in patients with sepsis syndrome - Co-Principal Investigator - Celltech Ltd. - (\$60,000)
- Virulence determinants and cytokine induction of blood isolates in septic patients - Principal Investigator. Multicenter Septic Shock Study Group - Case Western Reserve University - (\$36,000)
- 1991 The impact of imipenem on the resistance patterns of nosocomial isolates in the Intensive Care Unit. Co-Principal Investigator. Merck-Sharpe and Dohme (\$98,000)
- Preclinical studies of bacteriocidal permeability increasing protein for treatment of septic shock. Principal Investigator. Incyte Pharmaceuticals (\$42,000).
- The potential value of a monoclonal antibody directed against bacterial endotoxin in experimental *Pseudomonas* sepsis. Principal Investigator. Xoma Corporation (\$46,000)
- A multicenter phase II trial of the Use of Interleukin-1 Receptor Antagonist in the Treatment of Sepsis syndrome. Co-Principal Investigator. Synergen-Pharmaco (\$30,000)
- Interleukin-1 Receptor Antagonist in the Treatment of Experimental Septic Shock. Co-Principal Investigator. Synergen Corporation (\$10,000).

- 1992 A Multicenter Phase III Trial of Interleukin-I Receptor Antagonist in Treatment of Sepsis Syndrome. Co-principal investigator. Synergen (\$60,000).
- A multicenter phase II trial of a monoclonal F(ab)2' antibody, MAK195F, in the treatment of sepsis. Co-Principal Investigator. Knoll Pharmaceuticals (\$550,000).
- The efficacy of a chimeric anti-TNF monoclonal antibody in the treatment of gram-positive and gram-negative sepsis. Principal Investigator. Celtech Ltd. (\$38,000)
- A Phase II Study of the Human Recombinant Fusion Proteins TNF R1: Fc IgG in the Treatment of Sepsis. Immunex (\$45,000) Principal Investigator.
- 1993 Pre-clinical Investigation of BPI as a Therapeutic Agent in Gram-Negative Infections. Incyte (\$59,000) Principal Investigator.
- CRF as a Therapeutic Agent in Experimental Gram-Negative Sepsis. Principal Investigator. NTI (\$47,000).
- A Multicenter Second Phase III trial of Interleukin-1 Receptor Trial in Severe Sepsis and Septic Shock. Co-principal Investigator, Synergen (\$60,000).
- Analysis of Endotoxin Levels in Septic Patients. Principal Investigator. Synergen (\$10,000).
- 1994 Utility of Limulus Endotoxin neutralizing Protein in the Neutropenic Rat Model of Gram-Negative Sepsis. Associates of Cape Cod - Principal Investigator (\$32,000).
- The North American Multicenter Sepsis Trial of a Murine Anti-TNF Monoclonal Antibody (NORASEPT II). Principal Investigator, Brown affiliated hospitals - Miles-Bayer (\$138,000).
- 1995 Differential Endotoxin Release in Relationship to Beta- Lactam Therapy for Gram-Negative Bacteremia. Merck Research Laboratory - Principal Investigator. (\$38,000)
- Potential Clinical Utility of High Density Lipoprotein as an Anti-endotoxin Agent in Sepsis. Co-principal investigator. Alpha Therapeutics (\$28,000)

Interleukin-11 as a Potential Therapeutic Agent in Experimental Sepsis and Neutropenia. Genetics Institute. Principal Investigator (\$54,000).

A Comparative Study of Differential Antibiotic-Induced Endotoxin Release in Patients With Urosepsis. Principal Investigator. Investigator Initiated IND# 48, 987. (\$85,000)

1996 Antibiotic-induced Endotoxin release and the host inflammatory response; in vitro and in vivo correlations. Principal Investigator, Merck Research Laboratory (\$28,000).

A phase II clinical evaluation of VP643843 a new experimental antiviral agent in the treatment of enteroviral meningitis. Principal Investigator, ViroPharma (\$58,000)

Combination immunotherapy with G-CSF and interleukin-11 in the treatment of sepsis in chemotherapy induced neutropenia. Principal Investigator, Genetics Institute, (\$29,000).

Anti-endotoxin compounds in the prevention and treatment of experimental intra-abdominal sepsis. Merck Research Laboratories. Principal Investigator (\$28,000).

1997 A phase I clinical trial of anti-endotoxin subunit vaccine. Co-Investigator, National Institutes of Health (\$186,000) pending.

PEER REVIEWED PUBLICATIONS

Original Papers

1. Opal, SM, Cross AS, Gemski P. K antigen and its effect on serum sensitivity of rough *E. coli*. Infection and Immunity 37(3):956- 960, 1982.
2. Cross AS, Opal SM, Kopecko DJ. Progressive increase in antibiotic resistance of gram negative bacterial isolates at Walter Reed Hospital, 1976-1980. Archives of Internal Medicine 143:2075-2080, 1983
3. Piziak MV, Woodbury C, Berliner D, Takafuji E, Kirkpatrick J, Opal SM, Tramont E. Resistance trends of Neisseria gonorrhoeae in the Republic of Korea. Antimicrobial Agents and Chemotherapy 25(1):7-9, 1984.

4. Willis SM, Opal SM, Fitzpatrick JE. Cytophagic histiocytic panniculitis. Archives of Dermatology 121:910-913, 1985.
5. Witte MC, Opal SM, Gilbert JG, Pluss JL, Thomas DA, Olsen JD, Perry ME. Incidence of fever and bacteremia following transbronchial needle aspiration. Chest, 89:85-88, 1986.
6. Opal SM, Asp A, Cannady P, Morse P, Burton L, Hammer P. Efficacy of infection control measures during a nosocomial outbreak of disseminated aspergillosis associated with hospital construction. Journal of Infectious Diseases 153 (3):634-637, 1986.
7. Goodwin R, Opal SM. Polymicrobial bacteremic pneumonia: A report of three cases caused by Staphylococcus aureus and Streptococcus pneumoniae. American Review of Respiratory Disease. 136:1005-1006 1987.
8. Opal SM, Cross AS, and Palmer M, and Alamazon R. Group B Streptococcal infection in infants and adults: Contrasts and Comparisons. Archives of Internal Medicine 146:641-645, 1988.
9. Opal SM, Cross AS, Gemski P: Survey of purported virulence factors of E. coli isolated from human blood, urine, and stool specimens. European Journal of Clinical Microbiology and Infectious Diseases 7:425-428, 1988.
10. DeBuono B, Brondum J, Kramer J. Gilbert R, and Opal S.: Plasmid serotypic and enterotoxin analysis of Bacillus cereus in an outbreak setting. Journal of Clinical Microbiology. 26:1571-1574, 1988.
11. Opal SM, Johnson A, Cross A,. Staphylococcal scalded skin syndrome in two immunocompetent adults caused by exfoliatin B producing Staphylococcus aureus. Journal of Clinical Microbiology 26:1283-1286, 1988.
12. Opal SM, Boyce JM, Medeiros AA, Mayer KH, Lyhte LW. Modification of homogeneous resistance in a methicillin resistant strain of Staphylococcus aureus by acquisition of a beta-lactamase plasmid. Journal of Antimicrobial Chemotherapy 23:315-325, 1989.
13. Collins HH, Cross AS, Dobek A, Opal SM, McClain JB, Sadoff JC: Oral ciprofloxacin and anti-lipopolysaccharide monoclonal antibody protect neutropenic rats from lethal infection with Pseudomonas aeruginosa. Journal of Infectious Diseases 159:1073-1082, 1989.
14. Opal S. M., Mayer K. H., Roland R., Brondum J., Heelan J., Lyhte L. Investigation of a foodborne outbreak of Salmonellosis among hospital employees. American Journal of Infection Control 17:141-147, 1989.

15. DeBuono, B. Opal, SM, Sarafian S, Lyhte, LW. Analysis of an outbreak of Penicillinase-producing Neisseria gonorrhoeae in Rhode Island, 1987. Journal of Clinical Microbiology, 27:2125-2127, 1989.
16. Cronan J, Marcello A, Horn D, Robinson, Dorfman G, Opal S. Antibiotics and nephrostomy tube care: development of bacteruria. Radiology 172:1041-1042, 1989.
17. Cronan J, Horn D, Marcello A, Robinson A, Paoletta L, Lambiose R, Haas R, Opal S, Dorfman G. Antibiotics and nephrostomy tube care: Development of bacteremia. Radiology 172:1042-1045, 1989.
18. Boyce JM, Potter-Bynoe G, Opal SM, Dziobek L, Medeiros AA. A common source outbreak of Staphylococcus epidermidis infections among patients undergoing open heart surgery. Journal of Infectious Diseases 161:493-499, 1990.
19. Opal SM, Cross AS, Gemski P, Lyhte LW. Aerobactin and alpha-hemolysin as potential virulence factors in E. coli isolated from human blood, urine, and stool. Journal of Infectious Diseases 161:747-749, 1990.
20. Opal SM, Cross AS, Bodmer MW, Palardy JE, Victor GH, Monoclonal antibody directed against TNF protects neutropenic rats from lethal pseudomonas sepsis. Journal of Infectious Diseases 161:1148-1152, 1990.
21. Opal SM, Mayer KH, Stenberg M, Blazek J, Mikolich, Dickensheets D, Lyhte LW, Trudel R, Musser JM. Nosocomial colonization of health care workers by endemic multiply resistant bacterial pathogens. Infection Control and Hospital Epidemiology. 11:479-485, 1990.
22. Neill M.A., Opal S.M., Giusti R.A., White R., Culpepper L., Mayer K.H. Lack of efficacy of ciprofloxacin in preventing gastrointestinal carriage in Salmonellosis. Annals of Internal Medicine; 114:195-199, 1991.
23. Victor GH, Opal SM. Spontaneous bacterial peritonitis: analysis and outcome. Canadian Journal of Infectious Diseases 2(4):147-154, 1991.
24. Opal S.M., Cross A.S., Sadoff J.C., Collins H.H., Victor G.H., Palardy J., Bodmer M. The efficacy of anti-LPS and anti-TNF monoclonal antibodies in experimental Pseudomonas sepsis. Journal of Clinical Investigation, 88:885-890, 1991.
25. Weist P, Opal SM, Olds GR, Romulo R. The characteristics of malaria in Rhode Island, 1985-1990. American Journal of Medicine 91:30-36, 1991.

26. Heelan J., Opal SM, Brissette E. The impact of converting to a biphasic culture medium in the incidence of Pseudobacteremia. Diagnostic Microbiology and Infectious Diseases. 1992; 15:5-11.
27. Horn D.L., Opal S.M. Computer assisted review of antibiotic selection for bacteremia. Infectious Diseases and Clinical Practice. 1:169-173, 1992.
28. Boyce JM, Opal SM, Potter-Bynoe G, LaForge RG, Zervos MJ, Furtado G, Victor G, Medeiros AA. Emergence and nosocomial transmission of ampicillin-resistant enterococci. Antimicrobial Agents and Chemotherapy 36:1032-1039, 1992.
29. Kim K.S., Was C.A., Cross A.S., Opal S.M. Modulation of blood-brain barrier permeability by tumor necrosis factor and antibody to tumor necrosis factor in the rat. Lymphokine and Cytokine Research. 11:293-298, 1992.
30. Cross A.S., Opal S.M., Sadoff J., Palardy J.E., Bodmer M. Combination immunotherapy in experimental *Pseudomonas* sepsis. Journal of Infectious Diseases 167:112-118, 1993.
31. Romulo RLC, Opal SM, Palardy JE. Efficacy of anti-endotoxin monoclonal antibody alone or in combination with ciprofloxacin in neutropenic rats with *Pseudomonas* sepsis. Journal of Infectious Diseases 167:126-130, 1993.
32. Fisher CJ, Opal SM, Dhainaut JF, Stephens S, Zimmerman J, Nightengale P, Harris S. et al. Influence of a murine anti-TNF monoclonal antibody (CB0006) on cytokine levels in patients in sepsis. Critical Care Medicine 21:318-327, 1993.
33. Richards MJ, Rittman M, Gilbert TT, Opal SM, Debuono B, Neill RJ, Gemski P. An unusually severe foodborne outbreak caused by Staphylococcal enterotoxin A. Public Health Reports 108:765-771, 1993.
34. Knaus WA, Harrell FE, Fisher CJ, Jr., Wagner DP, Opal SM, Sadoff JC, Hein M, Walawander CA, Conboy K, Grasela JH. The clinical evaluation of new drugs for sepsis: A prospective study design based on survival analysis. Journal of the American Medical Association 270:1233-1241, 1993.
35. Boyce JM, Opal SM, Potter-Bynoe G, Medeiros AA. Spread of methicillin-resistant *S. aureus* in a hospital after exposure to a health care worker with chronic sinusitis. Clinical Infectious Diseases 17:496-504, 1993.
36. Hewlett D, Franchini D, Horn D, Alfalla C, Lue Y, Rodriguez M, Roberto M, Yap R, Dipietro D, Peterson S, Eisenberg H, Opal S. An outbreak of multi-drug-resistant tuberculosis at a New York City Hospital. Morbidity and Mortality Weekly Report. June 11, 1993; Volume 42 (22): 427-434, 1993.

37. Cross AS, Opal SM, Sadoff JC, Gemski P. Choice of bacteria in animal models of sepsis. Infection and Immunity 61:2741-2747, 1993.
38. Fisher CJ, Slotman G, Opal SM, Pribble JP, Bone RC, Emmanuel G, Ng D, Bloedou DC, Catalano MA. Initial evaluation of human recombinant interleukin-1 receptor antagonist in the treatment of sepsis syndrome. Critical Care Medicine 22:12-21, 1994.
39. Fisher C.J., Marra M., Palardy J.E., Marchbanks C.R., Scott R., Opal S.M. Bactericidal/permeability-increasing protein reduces mortality rate from endotoxin challenge: A placebo-controlled study. Critical Care Medicine 22:553-558, 1994.
40. Pololi LH, Coletta EM, Kern DG, Davis S, Kiessling LS, Garber CE, Entin EJ, Opal SM, Rakowski W. Developing a competency-based preventive medicine curriculum for medical schools. American Journal of Medical Education 1:1-28, 1994.
41. Bhattacharjee AK, Opal SM, Palardy JE, Drabick JJ, Collins H, Taylor R, Coton A, Cross AS. Affinity purified E. coli J5 LPS-specific IgG protects neutropenic rats against gram-negative bacterial sepsis. Journal of Infectious Diseases 170:622-629, 1994.
42. Horn DL, Hewlett D. Jr., Haas WH, Butler WR, Crawford JT, Alfalla C, Tan E, Levine A, Nayak A, Peterson S, Opal SM. Superinfection with rifampin-isoniazid-streptomycin-ethambutol (RISE)-resistant tuberculosis in three AIDS patients: Confirmation by polymerase chain reaction fingerprinting. Annals of Internal Medicine 121:115-116, 1994.
43. Suitters AJ, Foulkes P, Opal SM, Palardy JE, Emtages JS, Rolfe M, Stevens S, Morgan A, Holt A, Chaplin L, Shaw N, Nesbitt AM, Bodmer MW. Differential effect of isotype on efficacy of an anti-TNF-alpha chimaeric antibody in experimental septic shock. Journal of Experimental Medicine 179:849-856, 1994.
44. Boyce JM, Opal SM, Chow JW, Zervos MJ, Potter-Bynoe G, Sherman CB, Fortna S, Romulo RLC, Medeiros AA. Outbreak of multi-drug resistant Enterococcus faecium with transferable van B type vancomycin resistance. Journal of Clinical Microbiology 32:1148-1153, 1994.
45. Fisher CJ, Dhainaut J-F, Opal SM, Pribble JP, Balk RA, Slotman GJ, Iberti TJ, Rackow EC, Shapiro MJ, Greenman RL, Reines HD, Shelly MP, Thompson RW, LaBreque JF, Knaus WA, Sadoff JC, Recombinant human interleukin-1 receptor antagonist reduces the mortality of patients with sepsis syndrome as a function of disease severity: A randomized double-blind placebo controlled trial. Journal of the American Medical Association 271:1836-1843, 1994.
46. Opal SM, Marra MN, McKelligan B, Fisher CJ, Palardy JE, Scott R. Relative concentrations of endogenous endotoxin binding proteins in infected body fluids. Lancet 344:429-431, 1994.

47. Fisher CJ, Opal SM, Lowry SF, Sadoff JC, LaBrecque JF, Donovan HC, Lookabaugh JL, Lemki J, Pribble JP, Stroma SC, Vigers GP, Russel DA, Thompson RC. Role of interleukin-1 and the therapeutic potential of interleukin-1 receptor antagonist in sepsis. Circulatory Shock 44:1-8, 1994.
48. Rice S, Palardy JE, Thornton L, Heinl R, Opal SM, Clinical, laboratory and management features of a statewide outbreak of enterovirus meningitis. Clinical Infectious Diseases 20:931-937, 1995.
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MANUSCRIPTS SUBMITTED

1. Horn DL, Hazlett D, Opal SM. Tuberculous meningitis and nosocomial transmission of RISE resistant tuberculosis. Clinical Infectious Disease 1997 (submitted).
2. Opal SM, Palardy JE, Lemke J, Knaus W, Dubin P, Fisher CJ, Vincent J-L. Endotoxemic in sepsis: clinical, therapeutic prognostic implications. JAMA 1997 (submitted).
3. Opal SM, Jhung J, Keith J., Jr., Palardy JE, Parejo N, Schaub J. Therapeutic effects of interleukin-11 in immunocompromised animals with experimental gram-negative sepsis. Infection and Immunity, 1997 (submitted).
4. Ruzek M, Opal SM, Salazer-Mather TP, Biron CA. The role of interleukin-6 in the regulation of corticosteroid synthesis during systemic infection. Journal of Immunology, 1997 (submitted).

INVITED SPEAKER IN NATIONAL OR INTERNATIONAL SYMPOSIA

1. Philippine Society of Microbiology and Infectious Diseases. 3rd Annual Symposium. "New Concepts of Immunotherapy in Septic Shock." Makati Medical Center, Manila Philippines, May 15, 1991.
2. University of Southern California Conference of Active vs. Passive Antibody Therapy in Treatment of Infectious Diseases. "Anticytokine therapy in Infectious Diseases," Scottsdale, Arizona, June 1, 1991.
3. International Congress of Chemotherapy. "Experience with Monoclonal Antibody Therapy in the neutropenic Rat Model," Berlin, Germany. June 24, 1991.
4. Ruzek MC, Miller AH, Opal SM, Pearce BD, Biron CA. Characterization of early cytokine responses and IL-6 dependent pathway of endogenous glucocorticoid induction during murine CMV infection. J. Immunology 1997 (submitted).
5. National Investigator's meeting at the 31st Annual ICAAC Meeting. "Pre-clinical Studies With Anti-endotoxin Monoclonal Antibodies." Chicago, Illinois, September 28, 1991.
6. University of Virginia. National Symposium for Infectious Disease Specialists. "Advances in Immunomodulator in Sepsis." Jacksonville, Florida, February 23, 1992.
7. International Immunocompromised Host Society, 1992 Meeting. Symposium lecture. "Anticytokine Therapy in Immunocompromised Patients." Boulder, Colorado, June 25, 1992.

8. Interscience Conference on Antimicrobial Agents and Chemotherapy (32nd Meeting) Symposium "Animal models of sepsis, what, if anything do they tell us?" October 14, 1992.
9. Maurice Rapin Colloquia on Endotoxin Pathophysiology and Therapeutic Approaches: "Experience With BPI in Animal Models." Provence, France. November 7, 1992.
10. Maurice Rapin Colloquia on Endotoxin Pathophysiology and Therapeutic Approaches: "Interleukin-1 receptor antagonist as a therapeutic agent." Provence, France, November 8, 1992.
11. Vail Infectious Disease Conference (Annual Meeting Sponsored by University of Colorado Health Sciences Center) Invited Faculty Speaker, March 1-7, 1993.
12. International Symposium on Intensive Care and Emergency Medicine (13th Meeting). "IL-1ra and BPI in the Treatment of Sepsis" Brussels, Belgium, March 23, 1993.
13. The Third IBC Annual Meeting in Advances in the Diagnosis, Prevention, and Treatment of Endotoxemia and Sepsis. "Interleukin-1 receptor antagonist." Philadelphia, PA June 18, 1993.
14. The Fourth International Conference on Endotoxin. "The Role of TNF in Infectious Diseases." Academic Medical Center, Amsterdam, The Netherlands. August 18, 1993.
15. The Fifth International Steglitz Symposium on Sepsis. "Chimeras of LPS binding proteins and bactericidal permeability increasing protein as therapeutic agents in experimental gram-negative sepsis. Berlin, Germany, February 10, 1994.
16. Consensus Conference. Lessons learned from the phase II CB6 anti-TNF monoclonal antibody study. 3rd International Congress on the Immune Consequences of Trauma, Shock and Sepsis. Munich, Germany, March 3, 1994.
17. The Sigma Tau Research Conference. The Potential Utility of L-Carnitine in The Treatment of Human Sepsis and Lactic Acidosis. Rome, Italy, February 18, 1994.
18. The 3rd International Congress on the Immune Consequences of Trauma, Shock and Sepsis. "The Value of Animal Models in Sepsis." Munich, Germany, March 5, 1994.
19. The Philippine College of Physicians Annual Meeting. "Anti-cytokine Therapy in Infectious Disease". Plenary Session speaker. May 11, 1994.
20. 1st International Symposium on the Mediators of Sepsis. Potential role of combination immunotherapy in sepsis. Plenary session. Deauville, France, November 7-8, 1994.

21. European Shock Society Autumn Meeting. "The role of bacterolysis and LPS release." Symposium on Antibiotic Related Endotoxin Release. Deauville, France November 7, 1994.
22. International Symposium of Intensive Care and Emergency Medicine (15th Annual Meeting), "Combination Therapy in Sepsis." Brussels, Belgium, March 21, 1995
23. Cambridge Healthtech Institute Conference: Designing better drugs and clinical trials for sepsis/SIRS. "Lessons learned from clinical trials thus far." Washington DC, February 21-22, 1995.
24. The 15th International Symposium of Intensive Care Medicine Conference. "The Role of BPI in Anti-endotoxin Therapy", Brussels, Belgium, March 22, 1995.
25. Society for Critical Care Medicine Annual Meeting: "Antibiotic-Induced Endotoxin Release." New Brunswick, NJ, October 12, 1995
26. The Fifth Annual Organ Failure Academy Meeting. "The Failure of Recent Clinical Trials of Sepsis." Trieste, Italy, November 19, 1995.
27. The 16th International Symposium on Intensive Care and Emergency Medicine. "The Role of Interleukin-11; Endotoxemia in sepsis; the 2nd phase III IL-1ra sepsis trial." Brussels, Belgium, March 18-21, 1996.
28. International Congress of Infectious Diseases, "Clinical significance of endotoxin release during treatment with gram-negative infections." Hong Kong, June 12, 1996
29. Singapore Society of Intensive Care Medicine. "Sepsis, antibiotics, endotoxin and cytokines." Singapore, July 17, 1996.
30. University of Malaysia - Infectious Disease Division Lecture. "Current understanding of the pathogenesis of sepsis." Kuala Lampur, Malaysia, July 16, 1996
31. International Congress of Experimental Hematology. "The effect of recombinant human interleukin-11 on the monocyte/macrophage cell line". New York City, New York. August 23, 1996.
32. Anaesthesia, Pulmonary, Intensive Care and Emergency Medicine. Control mechanisms of the human immune response," Trieste, Italy, November 7, 1996.
33. The 36th Interscience Conference on Antimicrobial Agents and Chemotherapy. "The Physiologic role of human interleukin-11 in infections." New Orleans, LA, September 17, 1996.

- 34. Rockefeller Symposium: "Group A Streptococcal Infections: Why hasn't penicillin resistance developed." Rockefeller Institute, New York, NY, October 7, 1996.
- 35. The Royal College of Physicians Annual Meeting... "The Current Treatment of Septic Shock." London, United Kingdom, May 15, 1997.

COURSE DIRECTOR OR SCIENTIFIC ORGANIZING COMMITTEE

- 1. Brown University Continuing Medical Education Course - Tuberculosis in the 1990's. (Organizing Committee) Providence, RI, November 7, 1990.
- 2. World AIDS Foundation Grant - Sexually Transmitted Diseases in the AIDS era. (Course Director) Manila, Philippines, May 8-17, 1991.
- 3. Autumnal Thematic Meeting on Sepsis. (Symposium Scientific Organizing Committee). Deauville, France, November 7-8, 1994.
- 4. The 5th Annual IBC Conference on Endotoxemia and Sepsis. (Scientific Organising Committee). Review of Preclinical Studies on Endotoxin Shock, Philadelphia, PA June 19-21, 1995.
- 5. The 35th Annual ICAAC Meeting (Symposium Organizer) - "Clinical trials of sepsis - should we give up?," San Francisco, CA, Spetember 22, 1995.
- 6. The NIH Workshop on the Future of Sepsis Research. Relevance of Animal Models (Session Coordinator) Bethesda, Maryland, August 3-4, 1995.
- 7. The 4th International Congress on the Immune Consequences of Trauma, Shock and Sepsis. (Program Organizing Committee) Munich, Germany, March 4-8, 1997.
- 8. The 16th Annual IBC Conference on Endotoxemia and Sepsis (Scientific Organizing Committee). Endotoxin, Cytokines and Other Mediators of Sepsis. June 24-26, 1996, Cambridge, Massachusetts.
- 9. The 7th Annual IBC Conference on Endotoxemia and Sepsis. (Scientific Organizing Committee). April 28-30, 1997. Washington, DC.

ABSTRACTS PRESENTED AT REGIONAL, NATIONAL, OR INTERNATIONAL MEETINGS

- 1. Opal SM. Clinical utility of the Raji cell radioimmunoassay for detection of circulating immune complexes. Presentation to the American College of Physicians Meeting, Letterman Army Medical Center, San Francisco, California. January 24, 1979.

2. Opal, SM , Cross AS, Gemski P. The effects of K antigen on serum sensitivity of rough E. coli. Presented at the 82nd Annual Meeting of the American Society for Microbiology, Abstract #B163, Atlanta, Georgia, March 11, 1982.
3. Cross AS, Opal SM , Kopecko DJ. Progressive increase in aminoglycoside resistance in gram-negative bacterial isolates. Presented at the 22nd Interscience Conference on Antimicrobial Agents and Chemotherapy #533, Miami Beach, Florida, October 5, 1982.
4. Pluss JL, Opal SM. Recent experience in the diagnosis and treatment of pulmonary sporothrixosis. Presented at the American College of Physicians meeting, San Francisco, California. October 2, 1984.
5. Witte MC, Opal SM, Gilbert JG. The incidence of bacteremia associated with transbronchial needle aspiration. Presentation at the American College of Physicians Meeting, San Francisco, California, October 2, 1984.
6. Opal SM. Plasmid epidemiology and the dissemination of antimicrobial resistance. Presented at ACP Meeting, San Francisco, California. October 2, 1984.
7. Opal SM, et al. The epidemiology of nosocomial aspergillosis associated with hospital construction. Presented at the 85th Annual Meeting of the American Society for Microbiology, Las Vegas, Nevada. March 3-7, 1985, Abstract #L-28.
8. Opal SM, Cross A, Gemski, P. Survey of purported virulence factors of E. coli isolated from blood, urine, and stool specimens. The 86th Annual Meeting of the ASM, Washington, D.C. March 28, 1986. Abstract # B16.
9. Opal SM, Blaser MJ, Lytle LW. The Role of plasmids in the expression of serum resistance in Campylobacter fetus. Presented to The Interscience Conference on Antimicrobial Agents and Chemotherapy, New Orleans, LA, October 1, 1986, # 1087.
10. Opal, SM, Lytle, LW, Boyce, JM, Medeiros, AA, Mayer, KH. The Role of Beta lactamase Plasmids in The Expression of Methicillin Resistance in Staphylococcus aureus. Presented at the Northeast Regional Meeting of The American Society for Microbiology, Lake George, New York. September 26, 1986. #8
11. Mayer KH, Hopkins JD, Opal SM, Ellal JA, O'Brien TF: Molecular evolution of epidemic and endemic aminoglycoside resistant plasmids carrying the ANT(2") gene. Congress on Bacterial and Parasitic Drug Resistance, Bangkok, Thailand, December 10-13, 1986.

12. Opal SM, Cross AS, Palmer M, Almazan R: Group B streptococcal infection in infants and adults: Clinical characteristics and consequences. The 87th Meeting of the American Society for Microbiology, Abstract #L32, Atlanta, Georgia, March 4, 1987.
13. Boyce JM, Potter-Bynoe, Opal SM, Dziobek L, and Medeiros AA. An Epidemic of *Staphylococcus epidermidis* infections following open heart surgery. 27th Annual ICAAC, New York, New York, October 1987. Abstract # 604.
14. Victor GH, Opal SM. Spontaneous bacterial peritonitis: A persistent problem with a high mortality rate. 27th Annual ICAAC, New York, New York, October 1987. Abstract # 1092.
15. Opal SM, Boyce JM, Medeiros AA, Mayer KH, and Lyhte LW. Modification of homogeneous resistance by a beta-lactamase plasmid in a methicillin resistant strain of *Staphylococcus aureus*. 27th Annual ICAAC, New York, New York, October 1987. Abstract # 1026.
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